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sand could not be sharply drawn. Streaks and small pockets of black soil often extended down irregularly into what was apparently undisturbed sand. A zone was therefore recognized, below the disturbed surface soil, which we agreed to call the 'zone of doubt.' All implements or objects found in this zone were listed under 'C.' The bottom of the 'zone of doubt' was about 18 in. below the surface of the ground.

Below the bottom of the 'zone of doubt' we agreed that the sand was undisturbed by human agency and that any objects found there must be regarded as having been deposited at the same time with the sand, or possibly intruded from above, in which case some evidence or indication of such intrusion should be apparent.

The following method of investigation was then pursued:

One person entered the pit and gradually cut away the face with a trowel. As soon as any object was struck the rest of the party were notified and the sand around it was carefully removed. The distance from the bottom of the 'zone of doubt' to the object was measured and the object was then removed and examined. Each such object was immediately wrapped in a separate piece of paper, together with a memorandum of the facts in connection with it.

NOTES.

As far down as we dug we found roots of living trees, larva of June bugs (?), ants, and occasional disconnected spots or streaks of dark matter, which I took to be the remains of old decayed roots.

The undisturbed sand was found to be distinctly stratified and evidently a water deposit. Pebbles and gravel grains were not uncommon, especially in connection with the clay seams, and nearly all the chips and implements found were lying flat, although a few were more or less on edge.

Nothing but rough chipped implements

(palæoliths?) and fragments were found below the 'zone of doubt' up to the time when I left (4 p. m., Saturday, June 26th), when about one-half of the main excavation had been made.

Supplementary pits were also started close to the main excavation in order that others of the party might be occupied in digging at the same time. The methods employed were identical in each case.

We failed to verify the contention that only argillite chips and implements are to be found in the undisturbed sand. Some jasper, chert and quartz flakes were also found, but argillite was the most abundant material represented.

One fine chert implement was photographed in place. The details in regard to this and other objects found in the undisturbed sand are described by other members of the party.

CONCLUSIONS.

The writer accepts the conclusions of competent authorities that the so-called palæoliths are of human manufacture and that the sand in which they occur is of glacial age.

After a careful examination there seems to be no doubt that this sand is a water deposit and that it had not been disturbed by human agency prior to the time when it was excavated by our party.

The only controversy which seems possible is over the question of intrusion from above and, in view of the facts now adduced, the burden of proof should in fairness rest with those who hold this view.

ARTHUR HOLLICK.

DIVERSITY OF LANGUAGES.*

THAT type of civilization cannot be regarded as ideal or forethoughtful which

*Concluding section of the address on 'Improvident Civilization' by the Vice-President of Section I., Social and Economic Science, American Association for the Advancement of Science, Detroit, 1897.

tolerates a wide diversity of tongue in which to conduct its business or store up its ideas and valuable records. As already stated, difference of speech and writing tends to keep nations and races estranged, and so makes for war rather than peace. The only progress toward a uniformity of mother tongues now visible is by the slow and fitful process of political absorption by conquest or by trade. Singularly enough the acknowledged languages of learning, the Latin and Greek, seem to be losing rather than gaining their hold upon the best literature. This is not altogether a misfortune; for languages grow and expand to conform to the ideas of those who use them; and the original connotations of words are lost in their adaptations to new conceptions. In spite of the attempt to uphold the Roman tongue by the medical and priestly professions, it is no longer that spoken by Cicero. The English of to-day differs widely from that of Chaucer. But few famous treatises in science, philosophy, history or even theology are now written in Latin; other tongues command more readers, and it no longer so well serves as a vehicle for modern ideas. No language can escape this fate. The English, which is conceded by competent observers to be as rich, as flexible and precise as any of the great European tongues—though not as simple and symmetrical as some others—has embalmed in it quite as many of the indispensable works of the world, and has besides the suffrages of a hundred and twenty millions of people to whom it is vernacular, is nevertheless susceptible of great rectification, especially in the matter of pronunciation, spelling, and in the irregularity of the verbs. The testimony of Professor Merz, in writing of ‘Scientific Thought in the 19th Century,’ although strangely oblivious of American contributions, as such, uses the following language, after referring to the decaying use of the classics:

“The largest number of (Scientific) works perfect in form and substance, classical for all time, belongs probably to France; the greatest bulk of scientific work probably to Germany, but of the new ideas which during the century have fructified science the larger share belongs probably to England. Such seems to be the impartial verdict of history. During the second half of the century a process of equalization has gone on which has taken away something of the characteristic peculiarities of earlier time. The great problems of science and life are now everywhere attacked by similar methods. Scientific teaching proceeds on similar line, and ideas and discoveries are cosmopolitan property. So much more interesting must it be for those who have been born members of this international republic of learning to trace the way in which this confederation has grown up, what have been the different national contributions to its formation, and how the spirit of exact science, once domiciled only in Paris, has gradually spread into all countries and leavened the thought and literature of the world.”

Nevertheless the hope of establishing either Latin or Greek as alternative world-languages, of learning, has not been abandoned among the classically educated; but all expectation of seeing the former generally adopted, at least as a spoken tongue, must have passed. If the great start of the Roman Empire, and the subsequent extension of its speech over a larger empire by the Church, did not suffice to give it precedence the chances are much against it now. Like the Roman jurisprudence it lives chiefly in its offspring. It has been more or less engrafted on the native tongues; itself is practically a dead language. The Greek survives among living tongues, but has only a limited field as such. In scientific and classical education, and notably in nomenclature, it has a future of utility as an enricher. Some of the international medical conferences are, I believe, ready to adopt it as an alternative language for their limited uses.

Meantime the business of the world becomes more and more international and interlingual. The spread of telegraphs by land and under seas, the extension of steam-

ships and steam railways across frontiers, sometimes across several of them, not only crowd the nations together, but some common code of communication between them is a desideratum—the world of commerce no less than that of letters and research waits for it. Regulation for navigation on the high seas have been contrived by the maritime nations and adapted to all; we have likewise a growing communication and conformity in astronomical, chemical and electrical literature; uniformity of standards of weight and measurement, mechanical devices and the like. In a small way, too, we have a universal language in musical notation; in the telegraphic alphabet, in the deaf-mute and in algebraic signs. How much longer will the international requirements of the whole world have to wait before a real world-language is hit upon? Must we wait until the struggle for political boundaries of the dozen or twenty several nations of Europe has concentrated the smaller ones into one dominant prodigy? If not, when and how shall the movement be begun and carried out, and by whom? The time seems to be ripe for a practical consideration of these questions, and it concerns some association of learning to do so; and for several reasons the initiative would seem to be left with the Department of Social and Economic Science.

I need not enlarge upon the magnitude of the continuing loss from the present diversity of tongues, not only in the time and effort spent in acquiring several languages, when one beside the vulgar tongue might answer all purposes of education, if that other alternate tongue were common to the great civilized nations. The waste is still greater from the publication of researches, laws, treaties and records in several dresses, all of which must be consulted by the student who would keep abreast of the advance of knowledge. The shelves of our libraries are being piled high

with books of all shades of usefulness and uselessness, and an extensive ransacking of bibliographies is required to master any given topic. The most of these have only ephemeral value, but this again adds to the burden. One good effect of an alternate language of learning would be the saving from this weary plowing of the sands; the truly classic works worth preserving would in a few generations be winnowed out and a lifetime would not be consumed in mastering the works of authors long superseded, but which, as they now stand mingled side by side, are indistinguishable. An *Index Expurgatorius*, by a scientific college *de propaganda fide*, is not in accord with modern notions, but it would be a great step in advance to have all science uttered in one language and reviewed in the same. When one thinks of the ten thousand volumes printed annually by the presses in English alone, one is tempted to sympathize with that Arabian Calif who ordered the great library of his time destroyed on the ground that it was either superfluous or heretical.

Observe, there is no suggestion to invent a new language such as Volapuk aspired to be. We all know languages grow by laws of their own, and are not run into a mold. They are, however, plastic and susceptible of enrichment and improvement by human contrivance. Instances are quite numerous where one tongue has supplanted another; and the example of two or more languages being taught and used concurrently is quite common. In fact, the task of imposing a second speech on a nation is much easier than that of imposing another religious cult, or a change of metallic money standards, either of which is still deemed to be feasible.

The growth of languages may be compared to the formation of common paths and roads through the primitive wilderness; at first following the trails of wild beasts; whenever a tree falls across the path it is deflected and so continues long after the

obstruction has crumbled away. The tendency to these deviations and doublings seems to be inherent. The French is about the only tongue which has an officially appointed guardian to keep it within orthodox lines; and it must be added that none needed it so much, or has so much to be done for it remaining. What is needed, and would seem to be practicable, is the application of modern methods equivalent to the work of the civil engineer among the time-worn paths—a leveling and alignment, the taking out of kinks and détours, and introducing great precision and definiteness. It is no greater task for our time than the change to the Julian calendar was for that, and is comparable with the proposition to divide the year into 13 months of days. I fear it is not the proper or congenial rôle for philologists and lexicographers whose task will come in at a later stage, in the perfecting and grafting upon the adopted alternate language. Thus far their special interest seems to lie in the diversity rather than the uniformity of tongues; and their very modest efforts to introduce a more regular spelling and pronunciation, though not entirely barren, are, by no fault of theirs, hopelessly slow of adoption. The chances of these reforms would be better if English could be adopted as a world-language; and if another were chosen they might be needless.

This Association is called upon from time to time to join in international conferences, to recommend or appoint delegates to such gatherings, and to pass upon their reports touching matters of nomenclature, classification and standards. The cause of learning has very much at stake in an extension of this same function to language. Other interests are also concerned, and whether these other interests—foreign commerce, diplomacy, telegraph or transportation—shall take the initiative, or leave it to others, there should be a joint action and represen-

tation. This subject is already attracting the attention of practical business men, who may be expected to move in the matter faster than the teachers and lexicographers. While writing, my attention has been called to an address by a business man to a Boston business club, advocating the use of English as a world language. A table quoted from Mulhall, showing the growth of the great European languages in the years 1801 to 1890, shows that the English has increased 217 per cent., while no other except the German has reached so much as 100. I have added to it a column of estimated numbers, using the same tongues at the present time, in which the lead seems to be with the English, though this is liable to be challenged by the partisans of Russia, as the official language, though not the native one, of a nearly equal number.*

Can we assume that this lead can be maintained for another century, when the Russian Empire shall touch the two oceans and the Mediterranean, or when the German Empire shall extend from the North Sea to the Bosphorus? If not, there is nothing to be lost, and much to be gained, for us, by an earlier rather than a later settlement of this question.

There have also appeared in the daily press expressions from some learned society of Germany, which I am expecting to see authenticated any day, a willingness on

*INTERLINGUAL CONFERENCE.

Mulhall's Table of increase, 1801-1890.		Millions spoken by in 1895.
(% in 1801.)	(% in 1890.)	(Estimated.)
12.7	27.7	English : . . . 120.
19.4	12.7	French. . . . 46.
18.7	18.7	German 37.
9.3	8.3	Italian 32.
16.2	10.7	Spanish 22.
4.7	3.2	Portuguese . . 15.
19.	18.7	Russian (?) . . 129.
100	100	
		Scandinavian . 9.
		Holland . . . 5.

their part to adopt the English as an alternate world language, provided some necessary reforms were made in spelling and orally to make it more phonetic and conformed to the classic Latin and Greek. This is a very reasonable and fit concession to be imposed, and ought to be undertaken in our own behalf without regard to the propaganda. If, by some such concessions as these, the support of Germany, and perhaps also Holland, Scandinavia and Spain, can be won, the adoption of the English is assured; and we cannot too soon convene an international conference. The Germans are handicapped by a Gothic eye-destroying alphabet and an unmusical vocal speech, and are conscious of it. This is their opportunity and ours. The claim of the French as the established language of diplomacy is recognized in Europe, but, declining even there, would be outweighed even though supported by Russia. Opposition would be likely to come from that quarter, if from any; or from a possible coalition of all the rest against the leader. But fortunately this is a case in which there is no compulsion. No nation need be bound by any recommendation of the conference, if it thought it could do better to stand out. In brief it is the counterpart of the decimal metrical system; the advantages and drift of any action would be toward uniformity sooner or later. Professor Mahaffy is out in a very pronounced opinion as to the need of rectifying English; while Mr. Havelock Ellis, I perceive, is quoted as favoring French as a second choice.

My own idea about the manner of calling, and the composition of, such an interlingual conference is that, by virtue of her much greater foreign commerce, marine interests, including telegraph, postal, consular and diplomatic intercourse, the initiative would properly belong with the mother country. Any such call from her would be sure to sug-

gest some antagonism, and, most likely, also she would be asked to content herself with one vote on behalf of Britain and all her colonies, and attempt might be made to link in the United States. I have no idea that representation according to aggregate population would be acceptable. The most feasible plan will be by nations, or groups of nations, the offshoots and colonies not being reckoned, except in the single case of the United States, which, if expedient, could speak for Canada, too. The position of North America is one of peculiar freedom from jealousies and entanglements, and if the mother country will for this occasion graciously let her full-grown settled daughter appear in the foreground there will be less friction to encounter, and the result will be the same in either case.

There is a certain fitness aside from its expediency. American lexicographers and philologists have done more for the improvement of English in a hundred years than the British. Besides, the number of universities and students and the literary output are now comparable in volume, if not in quality, with the older nation. The ultra-conservatism of British publishers is shown by an unwillingness to handle books by American authors using the abridged spelling of certain common words where the right of argument is on our side. Again, in Asia, especially in China and Japan, which are now open to Occidental literature, science and arts, we are side by side with the British and opposed by French and German influences. If I am rightly informed, Japan is most anxious for uniformity; in fact, would accept readily a common tongue, and prefer the English. The part to be played by these islanders of the far East in international affairs cannot yet be defined, but their alliance in these bonds of peace, civilization and learning is worth cultivating.

As a rough outline of the composition of

the first conference on an alternate common language for international trade intercourse, letters, science and arts, let us suppose that whenever a sufficient number of avowals of interest in the subject shall have been received from representative bodies an invitation shall be addressed by the Secretary of State of the United States, or by this Association, or some similar body, to like associations and guilds in the following countries to choose delegates to meet at some suitable time and place in central Europe :

1. Great Britain, including colonies and India.
2. United States of America and Canada.
3. Germany, not including Austria.
4. Austria and the Hungarian and adjacent Slav states.
5. France including her colonies and Belgium.
6. Spain and Portugal.
7. Italy.
8. Greece.
9. Holland.
10. Scandinavia (Denmark, Sweden and Norway).
11. Russia.
12. The Spanish and Portuguese republics of North and South America.
13. Japan (by courtesy, not voting).

Each of these units to be represented by, say, five delegates drawn respectively from the larger international interests :

- A. Political—diplomatic and jurisprudence.
- B. Scientific—mechanical and medical.
- C. Foreign commerce and navigation.
- D. Telegraphic, foreign exchange and postal.
- E. Pedagogy, publishing and philology.

Here we may have a polyglot convention of say sixty-five persons, with sixty votes representing various pursuits. All that it need do is to pass resolutions, after preamble, recommending to their respective governments that it be made lawful on and after a certain date, say January 1, 1901, or as soon thereafter as may be, to use the language adopted, and that it shall be taught in all public schools as a second, or alternating, language; and further that all documents for interlingual use, such as passports, cable and telegraph blanks, naviga-

tion charts and astronomical codes, postage stamps, money orders, letters of credit, coins, tables of metric systems, shall be inscribed in both media. Similar action on the part of the guilds and institutions themselves would be sufficient to ensure the trial.

The work of simplifying the adopted tongue, so as to make it more acceptable and more easily acquired by the rest is quite another function, belonging to a different body, and can be reported on from year to year without limit of time. Our newest dictionaries contain already some thousands of minor and acceptable changes. It would greatly add to the regularity and euphony of the English (if it should be chosen) to incorporate and substitute freely from the Spanish as written (not, however, including the eccentricities of its pronunciation) in which case the Latin and Italian methods should be taken; in this way the good will of our neighbors on the American continent might be secured, with no detriment whatever to ourselves. Computations are sometimes made to show the enormous aggregate loss from the use of redundant or silent letters in writing and typesetting. This economy is easily embraced within the larger reform outlined above.

If it is the pleasure of the Section, during this meeting, to take any action on this subject, it will give us pleasure to urge it before the Council.

RICHARD T. COLBURN.

ELIZABETH, NEW JERSEY, U. S. A.

APPENDIX.

The following resolution was subsequently adopted by the Council, and copies ordered printed for corresponding societies, universities, etc.:

WHEREAS this Association is from time to time called upon to recommend or choose delegates to international conferences seeking to promote uniformity in scientific classification nomenclature, metrology, publications, and is likewise interested in uniformity of navigation and postal regulations, and researches

at present recorded in several differing European languages; and

WHEREAS the diversity of tongues is a continuing hindrance to interchange of knowledge and literatures, seriously enhancing the cost and labor of studious pursuits, which might in large measure be avoided by the adoption by the civilized nations of an Alternate Language of Learning, Law and Commerce, and as such required to be taught in higher schools (in combination with the mother tongue) and used in interlingual correspondence and printed records; and

WHEREAS it is believed this need is felt and acknowledged by societies and corporations of several nations and awaits the initiative of some one of them to propose concerted action thereon; now, therefore, be it

Resolved, That whenever the President or Permanent Secretary of the Association shall have received from similar bodies, or from universities of Europe, expressions sufficient in number to represent a majority of the maritime peoples, signifying a desire to cooperate in an International Conference of Languages, it shall be his duty to lay the same before the Council at the next regular, or, if need be, at a specially-called, meeting, with the view to the appointment of one or more delegates to represent American Pedagogy and Science thereat, at some convenient time and place in central Europe.

In like manner the Permanent Secretary is hereby authorized to acknowledge, on behalf of this Association, receipt of such invitation for a like purpose emanating from any government, or department thereof, Institution of Learning, Technical Science, Chamber of Commerce or Finance, Telegraphic or Transportation Bureau, Postal Union or Academy of Arts and Letters, and to pledge the further attention of this Council to the same.

GEOLOGY AND GEOGRAPHY AT THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

PROFESSOR I. C. WHITE, Chairman of the Section, being in attendance upon the International Geological Congress in Russia, the Council filled the vacancy by the election of Professor E. W. Claypole, who read Professor White's address and presided over the meetings of the Section.

After the presentation of the vice-presidential address, the following papers were read:

1. 'The Geological Age and Fauna of the Huerfano Basin, in Southern Colorado,' by Professor H. F. Osborn, New York.

The author reviewed the work of R. C. Hills, and concluded from recent field work that the Huerfano Lake deposits are from 800-1000 thick, consisting of upper beds equivalent to Bridger, and lower beds equivalent to Wind River and Wasatch. Below them is an unconformable series, probably Cretaceous. The distribution of deposits indicates a different extension of the lake from that given by Hills. Brief reference was made to the fossils found.

2. 'Lake Chicago and the Chicago Outlet,' by Frank Leverett, Denmark, Iowa. The paper discussed, in detail and with abundant data, the beaches and outlet of Lake Chicago, a glacial lake having southward discharge from the southern end of Lake Michigan basin, through the Des Plaines and Illinois rivers to the Mississippi.

3. 'Some Features of the Recent Geology Around Detroit,' by Frank B. Taylor, Fort Wayne, Ind. Detroit is built on moraines deposited under 200 feet of water. While the ice front was here the western half of Erie basin was filled by a glacial lake. This gives a very smooth surface contour. Shore lines and beaches are well developed. The lower courses of old tributaries of Detroit river are drowned. Streams two miles long have deep estuaries, much deeper than they could erode under present conditions, *e. g.*, Rouge River and Baby Creek. Rouge River, four miles above its mouth, has an average mid-stream depth of from 20 to 30 feet, four times deeper than would be expected from the stream's own erosion. The same is true of the St. Clair tributaries. The succession of events has been as follows: The rivers first flowed as now, but slightly higher. Then, while the upper lakes drained to the Ottawa, abandoning the St. Clair and Detroit Rivers, the streams were cutting to a base level from 25 to 30 feet lower than present river surface. Finally, a north-east uplift established existing conditions